

CLAIMS

1. Gas-filled spring (1) that operates using gas (13, 14) and is primarily intended for a vehicle, such as a motor cycle (6, 7) or car, in which the gas-filled spring comprises a cylinder (2) and at least one piston (4), which operates therein and which divides the internal space of the cylinder into a compression chamber and an expansion chamber (return chamber), and in which an arrangement is designed to ensure maintenance of the necessary quantities of gas and gas pressure settings or differential pressures in the chambers despite any gas leakage occurring, for example between cylinder and piston, and/or temperature variations occurring inside and outside the gas-filled spring, characterized in that the arrangement comprises one or more passages (12) which is/are arranged between the chambers and is/are open only in a predetermined or adjustable position (41) of the cylinder and the piston relative to one another, and that, each time the piston passes the said relative position during the movement of the piston in the internal space, the passage(s) thereby opened is/are designed to permit gas transfer (15, 16) between the chambers (8, 9) and/or pressure equalization in or differential pressure adjustment of the gas pressures in the chambers.
2. Gas-filled spring according to Claim 1, characterized in that the position, here called the first position (41), is situated at a relatively short offset distance (A) from the fully expanded position of the gas-filled spring, for example 1 to 50 mm, from the first position.

3. Gas-filled spring according to Claim 2, characterized in that, in the first position, the pressure (P) in the chambers (8, 9) is relatively low, for example 1 to 20 bar, compared to the maximum pressure of the chambers occurring in the functioning of the gas-filled spring.
4. Gas-filled spring according to Claim 1, 2 or 3, characterized in that, in a force-stroke curve produced by the gas, gentle curve transitions (34c) are executed preferably throughout the stroke length range.
5. Gas-filled spring according to any one of Claims 1 to 4, characterized in that the expansion chamber or the return chamber (9) is connected to or comprises a non-return valve function (17) forming part of the arrangement and designed to deliver gas (21) to the expansion chamber if the pressure in the expansion chamber is less than the atmospheric pressure or the feed pressure.
6. Gas-filled spring according to Claims 5, characterized in that the non-return valve function (17) connects to the surrounding atmosphere (27) or atmospheric pressure if the gas volume or gas pressure is too low.
7. Gas-filled spring according to Claim 6, characterized in that the non-return valve function (17) connects to a gas volume or gas pressure-boosting element (23), for example a pump, forming part of the arrangement if the gas volume or gas pressure is too low.

8. Gas-filled spring according to any one of Claims 1 to 7, characterized in that, in the said open position(s), gas (21) can be discharged via a pressure-relief valve function (28), for example into the surrounding atmosphere (29), should the pressure have risen in one or both of the chambers due to an increase in temperature, for example.
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9. Gas-filled spring according to any one of Claims 1 to 8, characterized in that the arrangement comprises an adjusting element (45), such as a manually actuatable adjusting element (46), designed to produce an external adjustment of the gas volume and/or gas pressure in one or both of the chambers (8, 9).
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10. Gas-filled spring according to any one of Claims 1 to 9, characterized in that the arrangement is designed to alter the said position depending on the adjustment, for example a manual adjustment.
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11. Valve forming part of a gas-filled spring that operates using gas and comprises a cylinder (2) and a piston (4), which operates in the internal space of the former and which divides the internal space into a compression chamber and an expansion chamber (8, 9), in which the gas in the chambers is subject to changes in volume and/or pressure, characterized in that the valve is designed, in a predetermined (41) or set position of the cylinder and the piston relative to one another, to effect an exceptionally rapid gas discharge or pressure adjustment which counteracts the said changes.
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12. Valve according to Claim 11, characterized in that it comprises a spring-loaded piston (31), which, as a function of its longitudinal displacement, keeps a
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duct for the discharge of gas open or closed, and that the said piston (31) is arranged with or on diaphragms (36, 37) each designed to seal off a space (28b and 28c respectively) in the valve (28) and to
5 afford the piston a suspension which is on the one hand laterally rigid and on the other pliable in the longitudinal direction thereof.

13. Valve according to Claim 11 or 12, characterized in
10 that the piston in the said duct is provided with a seal (33), for example an O-ring seal, arranged in a protected position.

14. Valve according to Claim 11, 12 or 13, characterized
15 in that a spring function (38) producing the spring loading is adjustable or replaceable for setting of the desired regulating position.